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JPRS L/8251

29 January 1979

[redacted]

WEST

EUROPE

[redacted]

FRANCE: NUCLEAR, MISSILE, AND SPACE DEVELOPMENTS

FOUO No. 452

U. S. JOINT PUBLICATIONS RESEARCH SERVICE

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BIBLIOGRAPHIC DATA SHEET	1. Report No. JPRS L/8251	2.	3. Recipient's Accession No.
4. Title and Subtitle FRANCE: NUCLEAR, MISSILE, AND SPACE DEVELOPMENTS, FOUO No. 452			5. Report Date 29 January 1979 6.
7. Author(s)			8. Performing Organization Rept. No.
9. Performing Organization Name and Address Joint Publications Research Service 1000 North Glebe Road Arlington, Virginia 22201			10. Project/Task/Work Unit No. 11. Contract/Grant No.
12. Sponsoring Organization Name and Address As above			13. Type of Report & Period Covered 14.
15. Supplementary Notes			

16. Abstracts

The serial report contains information primarily from French major daily newspapers and pertinent specialized journals on French nuclear, missile, and space technology, research and development.

17. Key Words and Document Analysis. 17a. Descriptors

France
Weapons
Aeronautics
Missiles
Nuclear Technology

17b. Identifiers/Open-Ended Terms

17c. COSATI Field/Group 16D, 18I, 19F, 22B

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
For Official Use Only. Limited Number of Copies Available From JPRS.	UNCLASSIFIED	22
	20. Security Class (This Page) UNCLASSIFIED	22. Price

FORM NTIS-35 (10-70)

USCOMM-DC 40329-P71

JPRS L/8251

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CONTENTS

WEU PROPOSES ESTABLISHMENT OF METEOROLOGICAL SATELLITE SYSTEM

Paris AIR & COSMOS in French 2 Dec 78 p 52

[Article by Pierre Langereux]

[Text] The assembly of the Western European Union (WEU), which held its 24th regular meeting in Paris on 20-23 November 1978, adopted two resolutions concerning European space activities. One concerns applications satellites (recommendation 326) and the other, meteorological predictions by satellite for civil and military use (recommendation 328).

The latter recommendation is particularly important since it proposes nothing less than establishment of a European organization, Eurometsat, to be responsible for exploiting operational civil meteorological satellites and setting up a European system of military meteorological satellites possibly linked to NATO [North Atlantic Treaty Organization].

Establishment of Eurometsat Organization

The WEU assembly notes "that it is of vital importance to establishment of meteorological forecasts in Europe to be able to have available appropriate data related to conditions on the surface and upper atmospheric layers above the North Atlantic, North Africa, and Central Africa" and it is convinced that it is time "to urge users (national meteorological services of European countries) to go to the operational phase of a European Meteosat system."

For this reason the WEU "encourages the European meteorological services and institutes to establish an organization responsible for launching the operational phase of a European system of meteorological satellites, Eurometsat, similar to the Temporary Eutelsat system set up by the European Posts and Telecommunications administrations."

Meteorological Satellites in Polar Orbit

The WEU also deeply regrets that "the system covering the North Atlantic has been reduced to four stations and that American meteorological ships have been replaced by Soviet meteorological ships." It directs the attention of

the member countries to "the necessity for obtaining more reliable, yet profitable, meteorological information about the North Atlantic as well as North and Central Africa by increasing the number of observation posts in those regions, the North Atlantic in particular, by installing a network of ocean buoys, automatic meterological data gathering by specially equipped aircraft, and setting up a system of meteorological satellites in polar orbit."

Military Meteorological Satellites

The WEU is also "aware that it is not possible in Europe, for political reasons" (because of participation by the neutral countries, Sweden and Switzerland, in Meteosat) to have the same meteorological and oceanic satellites shared by civil and military agencies, as is the case in the United States. It nevertheless "considers it necessary that Europe provide itself with a system of military meteorological satellites."

Under these conditions the WEU recommends that the Union's Council "give its active support to setting up, for purposes of defense, a system of meteorological satellites, possibly linked to the American national satellite program and that of NATO, and combined with an appropriate network of mobile ground stations."

The assembly also recommends that the WEU council "invite the member countries to test the presently existing meteorological coordination at the military level by undertaking more frequent exercises to verify the implementation of the recommendations formulated by the meteorological group of the NATO military committee."

Establishment of Worlwide Telecommunications Networks

In another field the WEU council is to "call upon the European Space Agency (ESA) to study the establishment of a more highly developed worldwide telecommunications network capable of gathering, at one and the same time, the data from meteorological satellites, teledetection satellites, and environmental surveillance satellites" for the purpose of forestalling the great scourges of mankind, such as drought, famine, natural catastrophe, pollution, and energy shortage, or at the very least to deploy the resources enabling the effects to be attenuated.

The WEU also calls upon the ESA "to study the feasibility of constructing a small prototype of solar satellite to provide electricity."

The WEU asks the ESA to provide the funds necessary for these two studies, and to provide, at the next meeting of the Agency's council, information on the status of the development project complementary to the Spacelab orbiting laboratory.

The WEU council is in addition called upon "to elaborate a policy defining the medium and long term objectives of the ESA as well as their financial impact and to have drawn up a long term budget assuring the existence of a study group responsible for defining a coherent program."

DETAILS ON MISSILE REGIMENT PROVIDED

Paris TAM in French 23 Nov 78 p 15

[Article by Lt J. G. Michel Patenotre: "Doing One's Military Service in the 3rd RA [Artillery Regiment]"]

> [Text] The 3rd Artillery Regiment, installed in the Mailly camp in the heart of the chalky Champagne, was in 1973 the first regiment equipped with PLUTON tactical nuclear missiles. The major part of its personnel--900 out of a total of 1,100--consists of draftees, a situation unique in the world as regards draftees' participation in the meaning of nuclear weapons.

Furthermore, the very special character of these weapons does not traumatize the young gunners who serve in the 3rd RA. Carrying out interesting duties and being entrusted with responsibilities is an excellent way to make the time go fast, especially since Mailly is 40 kilometers from Chalons-sur-Marne or Troyes, town big enough to offer diversion. "The only criterion which leads us to assign a duty to regular personnel rather than to recruits," Lieutenant Colonel Mureau, second in command, tells us, "is training time. There is really just one example--the PLUTON vehicle crew, in which the necessity of lengthy crew training prevents the draftees from having a place. Everywhere else, and especially in the missions of equipment and installations security, which are priority ones in peacetime, they take part as enlisted men or non-commissioned officers."

At the Same Rhythm

Yok, a magnificent Beauce shepherd, enters the shed where the special PLUTON equipment is kept, exposed; he goes around each vehicle and ends by discovering a man, whom he attacks and does not let escape. An order rings out; Yok releases his prey and returns docilely to sit at the feet of his handler, Gunner Schwartz. "When the dog group was created," he tells us, "I volunteered to become a dog handler, for I already had experience in training my own German shepherd. Yok and I have lived at the

same rhythm since I took him in charge at Suippes: 1 day out of 6, we do surveillance rounds of the sensitive zone, and the rest of the time goes for training and care of various kinds." This duty is absorbing, but does not prevent weekend leaves, for one of the six dog handlers takes charge of all the animals on weekends.

Gunner Schwartz does not complain about his lot: "One does not expect the same thing from a military dog as a 'civilian' dog, but the training method is unique, and I will have learned something," he tells us.

The Technology Scared Us a Little

The signals by which the order to fire arrives are of very special importance, and the radio sets are their essential carriers. Each of them has receiving and transmitting equipment and a generator set, and operates with relative autonomy, served by a regular-army noncommissioned officer, two operators, and a draftee operator-driver. "At the beginning, the technology scared us a little," artillery sergeant Pariss, operator, admits, "but practice, the use of what we learned in the elementary technical certificate school, and especially what we have had to teach to those who have taken on their duties after us, have given us confidence." He admits that when he arrived in the 3rd RA 10 months ago, he did not think that he would be a noncommissioned officer today and have such responsibilities.

To a Thousandth of a Degree

The precision of the impact depends on the precision of the shot's starting position, which is not difficult to understand. To comprehend the constraints which this entails is more difficult. Each PLUTON battery comprises, in addition to two firing sections and one PC [Control Station] section, a reconaissance section, whose mission is to indicate to each gun the place where it is to set up in firing position, and then, once the position is set, to determine its position and orientation as exactly as possible.

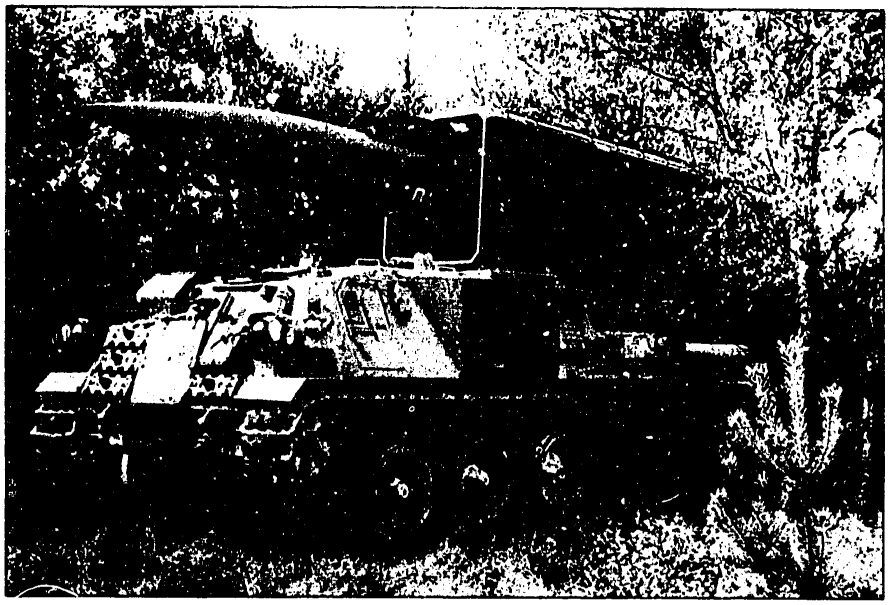
Gunner Thomassin is a gyrotheodolite crew member: with his instrument, he must know how to determine the azimuth of a point with a precision on the order of one-thousandth of a degree. His chief recognizes that he has incomparable skill. Modestly, he points out that "in civilian life, I am employed by a surveyor."

He has become a noncommissioned officer, but this does not interest him; he refers the use of precision instruments and perfection of measurement to officering duties--why not?

These are three examples of draftees to whom very real responsibilities have been entrusted.

In 1 day, I met at least 10 of them whom it is impossible to talk about here. Doubtlessly a highly technical regiment, as the PLUTON regiments can be. Is it richer in jobs which some like to call "noble?" More probably, each person finds, when he does his military service, the satisfaction which he wants to take the trouble to seek out, and is entrusted with the responsibilities which he knows how to show himself worthy of.

There is also an effort by the officer corps, but as Lieutenant Colonel Prevot, chief of staff, says: "When one assigns interesting duties to the draftees, they are very aware of them and take it to heart to do a good job."



A PLUTON vehicle of the 3rd RA in firing position

Artillery sergeant Pariss, radio operator

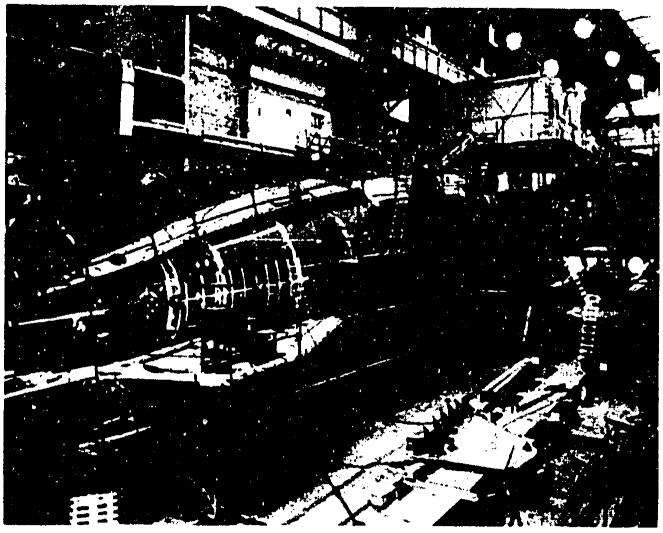
Gunner Thomassin is a gyrotheodolite crewman.

11267
CSO: 3100

NUCLEAR ATTACK SUBMARINE UNDER CONSTRUCTION

Paris AIR & COSMOS in French 30 Dec 78 p 91

[Text] The first nuclear attack submarine of the French Navy is now under construction by the DCAN [Naval Construction and Weapons Directorate] in Cherbourg. The accompanying photograph, taken in Cherbourg on 18 December 1978, shows the hull of the first "SNA" [nuclear attack submarine] completely assembled and the first assembly units of the second "SNA" (on the right). The 4th Plan, running from 1977 to 1982, calls for the construction of four such attack submarines. This program is the responsibility of the DTCN [Naval Shipbuilding Technical Directorate]. The submarines are to be armed with torpedoes and also with Aerospatiale's Exocet SM-39 missile that fires from under the surface.



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RADIOACTIVE WASTE VITRIFICATION PLANT DISCUSSED

Paris LE MONDE in French 27 Dec 78 p 10

[Article by Xavier Weeger]

[Text] Since 28 June of this year the first industrial-scale continuous vitrification plant for continuous processing of nuclear wastes has been in operation at the Marcoule Center for Nuclear Studies, in the Gard. Managed by COGEMA (The General Nuclear Materials Corporation), it has been in operation for more than 2,200 hours, and has turned more than 50 cubic meters of dissolved fission products from spent fuel reprocessing plants into glass.

Reprocessing, during which most of the "unburnt" uranium is recovered and plutonium is produced, yields liquids which are highly charged with dissolved or suspended wastes. These particles are extremely radioactive, and emit such heat that the solutions have to be kept in special holding tanks, where they are constantly cooled and stirred.

Storage of that sort can only be temporary, although it can be kept up for a very few decades. The hard fact is that it is altogether out of the question to use this kind of storage for products whose level of radioactivity will remain potentially hazardous for hundreds of years (see LE MONDE 15 March). Hence the intensive efforts now under way all over the world in search of intermediate (several decades) or permanent solutions to the storage question.

In the opinion of a good many international experts, vitrification is, right now, one of the most promising solutions around, and France, where the Atomic Energy Commission teams have been working on the problem for more than 15 years, has something of a head start in the field. The German Federal Republic and Great Britain are in fact keenly interested in the French process. The Marcoule vitrification plant (A.V.M.) is the first installation of its kind in operation anywhere in the world.

The purpose of vitrification, as of other processes of the same type, is to "trap" fission products and trace amounts of heavy elements, including uranium plutonium, and the other trans-uranium elements which reprocessing has not completely eliminated, inside an atomic structure strong enough to resist attack from them or anything else: the idea, briefly, is to imprison these substances inside materials that will withstand water, temperature changes, etc.

The initial studies conducted by the AEC centered on synthetic crystallized minerals such as feldspars or artificial mica. They very swiftly ran up against a twofold difficulty: experiments made it clear that they would have to develop as many crystallized materials as there were substances to be "fixed." This would, among other drawbacks, have posed very large problems when it came to processing on an industrial scale. Furthermore, these substances, despite their intrinsic hardness, presented very large surfaces for exchange with the outside (it is through such surfaces that atoms might migrate; therefore it is imperative to keep them as small as possible).

Very quickly, the French teams explain, they discovered, in the course of these experiments with synthetic minerals, that materials of a vitreous type (which appeared as by-products in the preparation of the synthetic minerals) -- in which the atoms are not arranged in a regular geometric system, as the crystalline substances are -- offered the most promising features. Specifically, their exchange surfaces with the outside are small, they are very strong, and their characteristics alter very little with age.

To prove this last point, the Marcoule teams set up artificial aging experiments, some of which subjected glasses to massive flows of radiation, and others in which large amounts of radioactive substances with short half-lives were incorporated into the glass. In the space of a few weeks, these glasses were subjected to as much radiation of all kinds as they would normally get in several centuries. Some of the Marcoule glasses which were "doped" with curium thus achieved an age greater than 10,000 years. The purpose of these experiments was to study phenomena which can occur: possible crystallization, what becomes of gaseous helium "manufactured" by alpha radiation (over 1,000 years, each liter of glass "produces" around 100 cc of helium -- measured at atmospheric pressure -- only a few fractions of which actually escape from the material).

The great stability of glasses is explained primarily by the fact that the elements to be isolated, fission products and heavy elements (known as actinides) are not merely surrounded by the material; they actually become part of it. Two pilot plants built at Marcoule, called "Gulliver" (which ran from 1961

to 1965) and "Piver" (1969 to 1973) gave the teams a chance to try out various mixes for the special glass they were after. (Shut down in 1973, the Piver plan is going to be brought back into service shortly for vitrification tests on solutions of fission products from reprocessing of fuels from the Phénix fast breeder reactor.)

The glasses produced by A.V.M., the first continuous process plant, contain around one-third of the elements from the solutions to be vitrified; the rest consists essentially of silicon and borates, which are responsible for the formation of the vitreous system. Other elements (sodium and calcium chiefly) are added; their role is to "open up" the vitreous system so that the foreign bodies can get into it.

The A.V.M. is a relatively small plant. The central cell, where the main operations take place, covers only a little over 100 square meters of floorspace, and is 3.5 meters high.

In the initial phase of operations, the solution for vitrification moves continuously, at a rate of around 40 liters per hour, into a slightly tilted cylindrical "calcinator," which revolves at a speed of 30 rpm; the calcinate left after evaporation of the volatile products flows by gravity into a metal melting furnace, heated by induction and kept at a temperature of around 1,200°C, where it is mixed, little by little, with fritted glass containing silicon, boron, and the system modifiers. When the furnace is full, about every 8 hours, on the average, the glass plug inside the furnace is melted. The 100 to 150 kilos of molten glass flows into a steel container. After three pourings, the container is sealed with a welded cover, cleaned under a jet of water at high pressure, then removed from the cell and transferred through a special airlock into a transporter which puts it into a storage pit that is cooled by circulating air. It can stay there for several decades.

As in all nuclear installations of this kind, which handle highly radioactive materials, a number of devices take care of recovering all gaseous effluents or dust, and recycling or filtering them.

The A.V.M.'s central cell is shut up behind thick walls of reinforced concrete with lead-glass windows. It is designed throughout so that all routine operations such as maintenance or emergency situations such as accidents can be carried out by remote control or robot handling. The installation, which was to all intents and purposes operational at the beginning of 1977, got its first delivery of radioactive solutions only in the summer of 1978. The Center used that time for a full dress rehearsal of every imaginable situation. The furnace plenum must be replaced every 1,200 hours: the first operation was performed without difficulty in mid-November.

The Marcoule experts are very confident of the design of their process and of the future of their plant, which cost some 500 million francs and employs 18 people. Within the space of a few months, it has vitrified 50 cubic meters of solutions of fission products, representing more than a year of production for all the reactors on the site. The teams are already at work on completion of installations at the vitrification plant at La Hague, where two or three lines of the same design as the one at Marcoule will complete the new reprocessing installations. The glasses turned out there, containing waste from light water reactors instead of those from graphite-gas reactors, will be markedly more radioactive. To make sure that the internal temperature of the glass blocks does not rise too high (which would lead to devitrification), they will most probably be stored for 4 or 5 years in water before being buried in pits like the ones at Marcoule.

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CSO: 3100

DETAILS OF EUROPEAN SPACE AGENCY'S 1979 BUDGET PROVIDED

Paris AIR & COSMOS in French 23 Dec 78 pp 40-41

[Article by Pierre Langereux]

[Text] The 1979 budget of the European Space Agency (ESA) amounts to a little more than 3 billion francs in funds for disbursement and about 2.4 billion francs in commitments for programs underway.

The 1979 budget of the ESA in fact provides 540.3 MUC [millions of accounting units] (or 3,054,900,000 million francs) in funds for disbursement and 424.7 MUC (or 2,401,300,000 francs) in fund commitments. This year (1978) the ESA had available 576 MUC (3,256,700,000 francs) of funds for disbursement and 742 MUC (4,195,300,000 francs) of fund commitments for its activities.*

More than 80 percent of the funds for disbursement in the 1979 budget have already been approved by the ESA Council and the directing committees for European programs.

The funds approved up to the present concern the Meteosat meteorological satellite program, the telecommunications satellites (ECS and MARECS A & B) and telecommunications technology satellite (ASTP) program, the Ariane [Ariadne] launcher program (including utilization support), the Spacelab orbiting laboratory program, and the Earthnet network. In connection with the Earthnet network of ground receiving stations for the data from the American teledetection satellites, a resolution by the Council is enabling this program, which is now optional, to continue, but it is planned in the near future that the Earthnet program will become a mandatory ESA program in which all the member countries will participate.

*Editor's note: The 1978 and 1979 funds are not directly comparable because the value of an accounting unit has changed. In 1979 the accounting unit is worth 5.65412 francs (except for the budgets for the Ariane and the expenses of Kourou), while in 1978 the accounting unit was worth 5.57942 francs.

Budgets Not Yet Approved

Among the on-going programs for which funding has not yet been approved by the Council (in whole or in part) there are the Spacelab utilization program, the Agency's general budget, and the scientific programs budget. The ESA Council, which met in Paris on 12-13 December 1978 did not succeed in approving the 1979 funding of the general budget and the scientific programs budget, Italy taking exception to the rule used by the ESA for conversion of currencies (which penalizes countries with high inflation). Failing to obtain the unanimous vote required for approval of those budgets in toto the ESA therefore had to resort to the procedure of "douziemes provisoires,"* as had already been the case during the entire year 1978 for the same reasons. The Council thus approved 3.4 "twelfths" for the general budget and 3.2 "twelfths" for the scientific programs budget, corresponding respectively to 36.8 MUC and 14.1 MUC (the "twelfths" being calculated upon the basis of funds authorized in 1978 under the heading of direct expenses, which were respectivly 129.88 MUC and 52.88 MUC for those two budgets). The total amounts planned in 1979 are 7.14 MUC for the general budget and 77.8 MUC for the scientific programs budget.

It is hoped that a formal decision on the budgets not yet approved will be reached at the next meeting of the ESA Council which will be held in Paris on 27-28 February 1979.

New Programs

In addition, the ESA has also planned on 25.3 MUC (143 million francs) in funds for disbursement and 201.4 MUC (1,138,700,000 francs) in commitments for new programs, some of which have been approved and some not yet approved, but whose budgets have not been adopted. These concern the ECS phase 3A programs, the Sirio 2 satellite program, the direct television satellite project (H-SAT or its successor), and the first European demonstration mission (DM1) aboard the Spacelab. There may possibly be added the supplementary development programs for the Ariane launcher and the Spacelab, which are going to be submitted to the next meeting of the Council.

The Council at its December meeting gave a favorable reception to the ESA proposals concerning European projects for further development of the Spacelab and teledetection. This project contemplates, in particular, placing experiments aboard the Spacelab and construction of a European teledetection satellite equipped with a radar with synthetic aperture and using a platform of the SPOT type or one derived from that of the French satellite.

*["douziemes provisoires," literally "provisional twelfths," is the procedure whereby the Agency, in the absence of an approved budget, is authorized to spend each month one twelfth of the total expended under the preceding year's budget.]

Sirio 2 Satellite

The ESA Council at its December meeting approved the European ECS phase 3A operational telecommunications satellites project and the Italian Sirio 2 scientific satellite project which have now become Agency programs. However, the final pattern of participation in these new programs has not yet been established.

The scale of participation in the Sirio 2 program should be decided at the next ESA Council meeting. Italy, which is proposing this project, will participate to the extent of 74.95 percent and will guarantee an additional Italian contribution of 4.3 percent in the event that the contributions of the other member countries are insufficient. Switzerland and the United Kingdom have also agreed--subject to government approval--to participation in the Sirio 2 to the extent of 4.40 percent and 1.83 percent, respectively. France and Germany had also contemplated participating in the program to the extent of 6.11 percent each. Provisional participations of the other member countries are as follows: Austria and Spain, 0.61 percent each; Belgium, 3.30 percent; and Denmark, 2.08 percent.

The total cost of the Sirio 2 program is now estimated at 21.16 MUC (119.6 million francs) but some estimate that it may reach about 40 MUC. The funding covers only the development of the satellite and the expenses of maintaining the program. As a matter of fact Sirio 2 will have the benefit, in the spring of 1981, of a free launching by the European Ariane launcher which will serve to launch the MARECS B maritime telecommunications satellite and to test the SYLDA Ariane double launch system.

Four ECS Satellites

The decision concerning the scale of contributions to the ECS phase 3A program is supposed to be reached at the next meeting of the telecommunications directing committee which will be held in Paris on 1-2 February 1979. But the December Council meeting has enabled the price for launching the program's satellites with Ariane launchers to be fixed right now: the price of a single launching (one satellite) is set at 24.44 MUC (135.6 million francs); the price of a double launching (two satellites) should be lower than that of a single launching.

Under these conditions as soon as the resolution concerning this phase 3A is approved by the program's directing committee it will be possible to execute the agreement between ESA and the acting Eutelsat organization responsible for exploiting the ECS satellites for the account of European posts and telecommunications administrations. The ECS program now comprises four satellites--ECS 1-4--which will be launched between 1981 and 1983 by Ariane rockets and constitute the first European space communications network.

H-SAT Deferred

On the other hand the ESA has put off until the next Council meeting its decision concerning construction of a European direct television satellite. The principal interested member countries, France and Germany, have not been able to agree on the satellite's mission: Bonn wants to develop right off an operational satellite whereas Paris up to now is proposing to construct an experimental satellite first. The Council has concluded that the H-SAT project study effected this year by the French-German Eurosatellite group had been properly managed but it was necessary for the two most concerned countries to submit a new joint proposal to the next Council meeting. In the meantime limited funds (300,000 accounting units) have been provided to maintain the project team.

Funds for disbursement (CP) and commitment funds (CE) of the ESA for 1979

Status	Program	Funds CP	Funds CE
Programs underway (budgets approved)	Meteosat development	11.5	2.2
	Meteosat exploitation	8.2	5.4
	Meteosat 2 (launching LO3)	3.2	3.6
	Telecommunications, phase 2	14.4	6.6
	ECS satellites	31.8	18.9
	MARECS A satellite	17.0	8.3
	MARECS B satellite	10.8	6.1
	Technology program (ASTP)	3.4	4.6
	Spacelab program	117.1	90.5
	Ariane launcher development	143.0	100.3
	Ariane utilization support	20.0	0.6
	Earthnet network	4.9	5.2
	Aerosat remainders (program abandoned)	0.2	0.3
Programs underway (budgets not approved)	Spacelab utilization (FSLP)	5.6	2.5
	Agency's general budget	71.4	144.4
	Scientific programs budget	77.8	26.2
Total programs underway (exluding domestic taxes)		540.3 MUC	424.7 MUC
New programs (budgets not approved)	ECS phase 3A program		
	Sirio 2 satellite		
	Direct television satellite (H-SAT)		
	DM 1 Spacelab mission and possibly		
	Supplementary Ariane development		
	Supplementary Spacelab development		
Total new programs		25.3 MUC	201.4 MUC

Editor's note: 1 accounting unit (1979) = 5.65412 francs

11706
CSO: 3100

MOBILE TELEMETRY STATION FOR ARIANE TRACKING DELIVERED

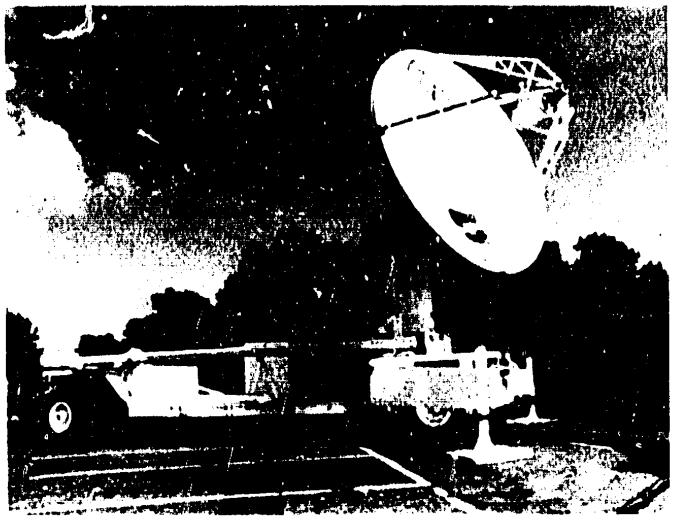
Paris AIR & COSMOS in French 23 Dec 78 p 41

[Article by Pierre Langereux]

[Text] The Starec firm (SFIM group) has delivered, to the Toulouse Space Center of the CNES [National Center for Space Studies], the Stella 35 mobile telemetry station intended for the tracking network, in South America, of the Ariane [Ariadne] rocket (photo).

Constructed in record time--less than 10 months following notification of contract award--the Stella 35 is a station transportable over the road or by railway or air. It will be initially installed near Belem, Brazil, to complete the network for reception of band 5 (2,200-2,300 megahertz) telemetry signals of the Guiana Space Center of the CNES. It will operate along with the other three telemetry stations--Stella 43—also constructed by Starec, which will be installed at fixed locations in French Guiana (Cayenne and Kourou) and in Brazil (Natal) as down the line stations of the tracking network.

The Stella 35 mobile telemetry station is equipped with an antenna 4 meters in diameter moveable in elevation and azimuth, whose gain is greater than 35.5 decibels and whose quality factor is equal to or greater than 10.5 decibels per degree Kelvin up to 2.5 degrees elevation; the directional precision is better than 0.3 degree (root mean square value). The antenna operates in left or right circular polarization in accordance with four tracking modes (objective designation upon the ephemerides drum automatic tracking with separation measuring receiver, or manual aiming by position or velocity). It uses the same primary source and separation measuring system as the 10-meter Stella 43 antenna. The Stella 45 antenna was constructed with Starec as general contractor and participation of CSEE (servo system and console bay) and Bell Telephone Manufacturing Company of Belgium (separation measuring receiver).



11706
CSO: 3100

MECHANICAL QUALIFICATION TESTS OF APPLE, METEOSAT 2 REPORTED

Paris AIR & COSMOS in French 23 Dec 78 pp 42-43

[Text] The mechanical qualification tests of the payload which will be launched by the European rocket, the Ariane [Ariadne] at the time of the third test flight firing (L03) planned for May 1980 have just been concluded at the Toûlouse Space Center of the CNES [National Center for Space Studies]. These tests were performed upon dynamic mock-ups of the satellites which will constitute the payload. These satellites in their launch configuration were placed upon a powerful electro-acoustic exciter (170 kilonewtons) which subjected them to longitudinal and transverse vibrations corresponding with the principal flight stresses. The tests were performed by teams from SOPEMA [Company for Specialized Environmental Testing Services] for the account of the European Space Agency (ESA) with participation by teams from European, French, and Indian projects responsible for different parts of this payload.

The L03 payload, installed in the nose of the launcher, in fact comprises three satellites mounted one above the other (and upon the equipment compartment of the rocket at the top of the third stage). These are, from bottom to top in the photo opposite):

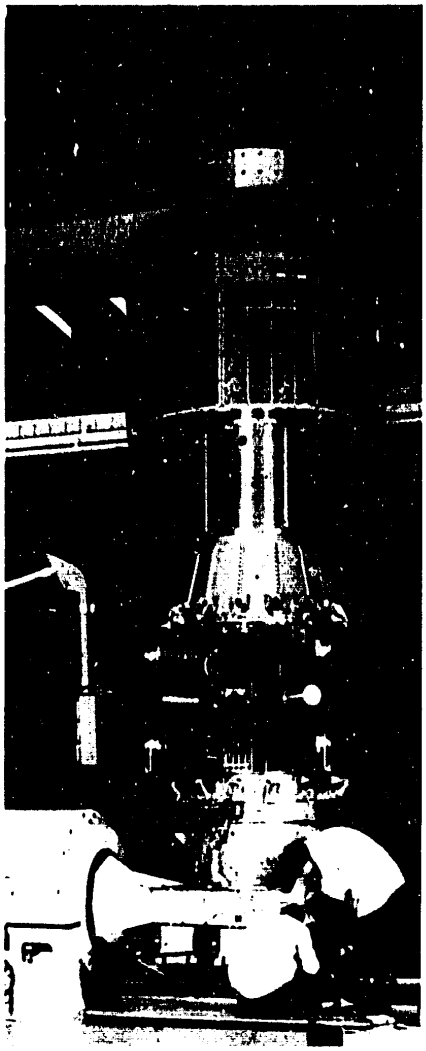
--the Ariane Technological Capsule (CAT) of about 200 kilograms used for all test flights;

--the first Indian experimental telecommunications satellite--APPLE--of about 620 kilograms built by the Indian Space Research Organization (ISRO); and

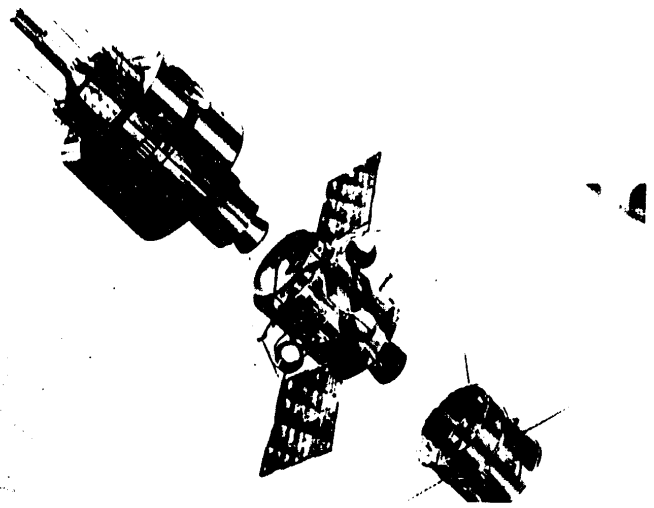
--the second European meteorological satellite--METEOSAT 2--of about 700 kilograms built in France by AEROSPATIALE [National Industrial Aerospace Company] and Matra for the account of the ESA.

The APPLE and METEOSAT 2 will be the first two satellites placed into geostationary orbit by the new European launcher. The Ariane will first place the two satellites (and the CAT) into a transfer orbit of 200-36,000 kilometers inclined at 9.5 degrees which will then be transformed into a circular orbit at the geosynchronous altitude by the apogee motors of each satellite. The CAT, in contrast, will remain in the transfer orbit.

The whole of this LO3 payload comprising the CAT plus the APPLE plus the METEOSAT 2 is about 6.5 meters high and weighs 1,574 kilograms.



The ensemble of the LO3 payload in launch configuration during tests at Toulouse; from botton to top: the CAT capsule, the APPLE satellite, and the METEOSAT 2 satellite.



The three satellites of the LO3 payload separated: METEOSAT 2 stabilized by rotation; APPLE (solar panels deployed) stabilized about three axes; and the CAT capsule. This is the first illustration of the Indian APPLE satellite.

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BRIEFS

ARIANE MOTOR TESTING--The CNES [National Center for Space Studies] and SEP [European Propulsion Company] have concluded their inquiry into the causes of the explosion which occurred on 28 November at Vernon, Department of Eure, during the bench test of the Ariane [Ariadne] rocket third stage motor. The inquiry disclosed that the explosion was due to accumulated hydrogen gas around the motor. This has led to modification of the bench's torch which normally burns the hydrogen to prevent dangerous accumulation of the gas. As for the cause of this abnormal accumulation of hydrogen, it is said to be due to the delay (0.4 second) in ignition of the motor. That delay is itself caused by the hydrogen gas injection in the vicinity of the igniter. This device, now eliminated from flight motors, is still used on the bench test motor. Additional tests are nevertheless going to be performed with a flight motor to determine the operating margins of the systems providing the ignition sequence. But this is not going to hinder continuation of the tests of the rocket's propulsion units; the next bench firing of the third stage propulsion unit in "battleship" configuration thus remains planned for 20 December. [Text] [Paris AIR & COSMOS in French 23 Dec 78 p 43] 11706

INTELSAT MARITIME SATELLITE DECISION--The Board of Governors of Intelsat has postponed until its next meeting in the end of January 1979 its decision concerning installation of an additional payload in three Intelsat 5 satellites for maritime liaisons (in addition to the international liaisons provided by these satellites). However, funds have been allocated to Ford Aerospace, constructor of the Intelsat 5 satellites, in order to retain this option until the next meeting of the board. Let us remember that most of the countries which use maritime telecommunications by satellite (except the United States), joined in the Pre-Inmarsat Joint Venture, recently expressed their preference for a mixed system comprising three European MARECS satellites and three Intelsat 5 satellites equipped with a maritime frequencies channel to replace the MARISAT satellites of the network now exploited by the United States. Comsat General Corporation, principal stockholder in the MARISAT system, has proposed to the Joint Venture a hybrid MARISAT 2 system utilizing the four LEASAT satellites leased from the U.S. Navy and two MARECS satellites. Comsat General Corporation is to present its project at the next Inmarsat meeting to be held in London this week and to the next meeting of the countries of the Joint Venture planned for mid-January at Brighton, Great Britain. [Text] [Paris AIR & COSMOS in French 23 Dec 78 p 43] 11706

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